REMARKS

The Office Action mailed March 18, 2004, has been received and reviewed. Claims 1, 4, 6 through 13, 20 through 24, 27, 29 through 33, 35, 36, and 43 through 46 are currently pending in the application. Claims 9, 20 through 23, 32, and 43 through 46 are withdrawn from consideration as being drawn to a non-elected invention. Claims 1, 4, 6 through 8, 10 through 13, 24, 27, 29 through 31, 33, 35 and 36 stand rejected.

Per this response, Applicant has cancelled claims 12 and 29, amended claims 1, 10, 13 and 24, and respectfully request reconsideration of the application as amended herein.

Supplemental Information Disclosure Statements

Applicant notes the filing of Supplemental Information Disclosure Statements herein on March 11, 2004 and March 19, 2004 and respectfully requests that the information cited on the PTO-1449 forms be made of record herein.

Oath/Declaration

The Examiner states that the oath or declaration is defective because it is not of sufficient quality to permit the identification of the city and state of residence of the inventor. Attached herewith is a copy of the declaration exhibiting sufficient quality to show the that residence of the inventor is Marsing, Idaho. Applicant respectfully requests approval of the declaration.

35 U.S.C. § 102(b) Anticipation Rejections

Anticipation Rejection Based on U.S. Patent No. 2,752,580 to Shewmaker

Claims 1, 8, 10, 11, 24, 31 and 33 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Shewmaker (U.S. Patent No. 2,752,580). Applicant respectfully traverses this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention

must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Claims 1, 8, 10 and 11

The Examiner cites Shewmaker as disclosing a method for aligning a semiconductor device package with a carrier substrate for electrical interconnection therebetween, comprising: forming at least two channels (17) through the semiconductor device package (13) from a first major surface thereof to a second, opposing major surface thereof; providing a major surface of the carrier substrate (21) with at least two alignment features (22) including forming at least two holes in the carrier substrate, each of which are spaced and position in respective correspondence to one of the at least two channels; placing the semiconductor device package over the carrier substrate with the first major surface of the semiconductor package facing the major surface of the carrier substrate; and aligning the at least two channels formed in the semiconductor device package with the at least two alignment features of the carrier substrate; providing at least two pins (16), wherein at least one of the two pins includes a mechanical self-locking mechanism (A, B – see page 6 of the Office Action) proximate at least on end thereof; placing the at least two pins through the at least two channels and into the at least two holes; and engaging a portion of the at least one of the second major surface of the semiconductor device package and a second, opposing surface of the carrier substrate with the mechanical self-locking mechanism. (See, Office Action, page 3). However, Applicant submits that Shewmaker fails to teach all of the limitations of claim 1 of the presently claimed invention.

Claim 1, as amended herein, is directed to a method for aligning a semiconductor device package with a carrier substrate for electrical interconnection therebetween. The method comprises: forming at least two channels through the semiconductor device package from a first major surface thereof to a second, opposing major surface thereof; providing a major surface of the carrier substrate with at least two alignment features including forming at least two holes the in the carrier substrate, each of which are spaced and positioned in respective correspondence to one of the at least two channels; *engaging the at least two channels formed in the semiconductor package with at least two pins carried by a head of pick and place device and grasping the*

semiconductor package with the pick and place device; positioning the pick and place device and the semiconductor device package over the carrier substrate with the first major surface of the semiconductor package facing the major surface of the carrier substrate; aligning the at least two pins with the at least two alignment features of the carrier substrate; and placing the at least two pins through the at least two channels and into the at least two holes.

Shewmaker, discloses a method of electrically interconnecting a printed circuit board with a fixed terminal board such that the printed circuit board may be easily removed and replaced with another circuit board. The circuits of the printed circuit board are electrically interconnected with circuits of the fixed terminal board by way of male banana plugs (16). However, Shewmaker fails to teach *engaging at least two channels formed in a semiconductor package with at least two pins carried by a head of pick and place device, and grasping the semiconductor package with the pick and place device.* As such, claim 1 is clearly not anticipated by Shewmaker.

Applicant submits that claims 8, 10 and 11 are also allowable as being dependent from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to claim 10, Applicant submits that Shewmaker fails to teach forming at least one of the at least two pins with a mechanical self-locking mechanism proximate at least one end thereof and engaging a portion of a second, opposing surface of the carrier substrate with the mechanical self-locking mechanism. While the Examiner points to elements "A and B" of attached FIG. 3 (page 6 of the Office Action), such features are clearly not self locking mechanisms which engage a portion of a second opposing surface of the carrier substrate. In contrast, the features pointed to by the Examiner are simply interference mechanisms which engage the *internal surface of the female banana plugs* (14 and 22).

Applicant, therefore, respectfully requests reconsideration and allowance of claims 1, 8, 10 and 11.

Claims 24, 31 and 33

Independent claim 24, as amended herein, is directed to a method of testing a semiconductor device package having a plurality of discrete conductive elements disposed in a

pattern on a surface thereof. The method comprises: providing a carrier substrate having a plurality of terminal pads arranged in a pattern corresponding to a mirror image of the pattern of discrete conductive elements; forming at least two channels in the semiconductor device package, each channel passing from a first surface thereof to a second, opposing surface thereof; providing the carrier substrate with at least two alignment features including forming at least two holes the in the carrier substrate, each of which are respectively spaced and positioned in correspondence to one of the at least two channels; placing the semiconductor device package over the carrier substrate; aligning each channel of the at least two channels formed in the semiconductor device package with a corresponding alignment feature of the at least two alignment features of the carrier substrate including placing pins *formed of a nonconductive material through the at least two channels and into the at least two holes*; electrically contacting each discrete conductive element of the plurality with a terminal pad of the plurality; passing at least one electrical signal between the semiconductor device package and the carrier substrate; and removing the pins subsequent to the alignment of each of the at least two channels with a corresponding alignment feature of the at least two alignment features.

As set forth hereinabove, Shewmaker discloses a method of electrically interconnecting a printed circuit board with a fixed terminal board such that the printed circuit board may be easily removed and replaced with another circuit board. The circuits of the printed circuit board are electrically interconnected with circuits of the fixed terminal board by way of male banana plugs (16). More specifically, Shewmaker states:

> The double-ended male banana plug 16 provides intermediate link in the connecting device and is complementary at one end to female plug 14 in the printed circuit board and at the other end to plug 22 in the terminal board....
>
> It will be apparent that the plugs 16 may be inserted into all or any desired sets of the terminal plugs 14 of the circuit board 13 *to obtain the desired circuit connections*. Thus by using this invention, a single circuit board 13 may be made to serve a plurality of purposes or functions. (Col. 2, lines 31-42; emphasis added).

In other words, the pins (16) of Shewmaker are clearly electrically conductive, which is in direct contrast with the presently claimed invention as set forth in claim 24. Applicant, therefore, respectfully submits that claim 24 is allowable over Shewmaker.

Applicant further submits that claims 31 and 33 are also allowable at least by virtue of their dependency from an allowable base claim.

Applicant, therefore, respectfully requests reconsideration and allowance of claims 24, 31 and 33.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 2,752,580 to Shewmaker in view of U.S. Patent No. 5,751,556 to Butler et al.

Claims 6, 7, 29 and 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Shewmaker (U.S. Patent No. 2,752,580) in view of Butler et al. (U.S. Patent No. 5,751,556). Applicant respectfully traverses this rejection, as hereinafter set forth.

> M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:
>
> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

The 35 U.S.C. § 103(a) obviousness rejections of the claims are improper because the references relied upon fail to teach or suggest all of the limitations of the presently claimed invention and because there is a lack of motivation to combine the references in the manner proposed by the Examiner.

Claims 6 and 7

Each of claims 6 and 7 depend from independent claim 1. Claim 6 introduces the additional subject matter of forming the at least two pins of an electrically non-conductive material. Claim 7 introduces the additional subject matter of forming the at least two pins of an anti-static material.

The Examiner cites Shewmaker as disclosing all of the limitations of claim 1 and then cites Butler as teaching forming the at least two pins of an electrically non-conductive or of an anti-static material. The Examiner then states that "it would have been obvious to a person of ordinary skill in the art to connect the semiconductor device package and carrier substrate with plastic pins." (Office Action, page 7). Applicants respectfully disagree.

As set forth hereinabove, Shewmaker discloses a method of electrically interconnecting a printed circuit board with a fixed terminal board such that the printed circuit board may be easily removed and replaced with another circuit board. The circuits of the printed circuit board are electrically interconnected with circuits of the fixed terminal board by way of male banana plugs (16). However, Shewmaker fails to teach or suggest all of the limitations of claim 1. More specifically, Shewmaker fails to teach or suggest *engaging at least two channels formed in a semiconductor package with at least two pins carried by a head of pick and place device, and grasping the semiconductor package with the pick and place device.* Nor does Butler teach or suggest such subject matter.

Moreover, there is a lack of motivation to combine the references in the manner proposed by the Examiner. Shewmaker expressly teaches the use of electrically conductive pins. The use of an electrically conductive material is evidenced by the following statements from Shewmaker:

> The double-ended male banana plug 16 provides intermediate link in the connecting device and is complementary at one end to female plug 14 in the printed circuit board and at the other end to plug 22 in the terminal board....
>
> It will be apparent that the plugs 16 may be inserted into all or any desired sets of the terminal plugs 14 of the circuit board 13 *to obtain the desired circuit connections.* Thus by using this invention, a single circuit board 13 may be made to serve a plurality of

purposes or functions. (Col. 2, lines 31-42; emphasis added).

In other words, Shewmaker expressly teaches away from forming the at least two pins of an electrically non-conductive material (claim 6) or an anti-static material (claim 7). Substitution of such pins for the banana plugs of Shewmaker would render the invention of Shewmaker useless as no electrical interconnections would be effected between the printed circuit board and the fixed terminal board.

Additionally, Applicant submits that use of such electrically conductive pins suggests, if not inherently teaches, the use of a material prone to allow the build of static electricity.

Applicants, therefore, submit that claims 6 and 7 are allowable over the combination of Shewmaker and Butler and respectfully request reconsideration and allowance thereof.

Claim 30

Claim 30 depends from independent claim 24 and the additional subject matter of forming the at least two pins of an anti-static material.

The Examiner cites Shewmaker as disclosing all of the limitations of claim 24 and then cites Butler as teaching forming the at least two pins of an electrically non-conductive or of an anti-static material. The Examiner then states that "it would have been obvious to a person of ordinary skill in the art to connect the semiconductor device package and carrier substrate with plastic pins." (Office Action, page 7). Applicants respectfully disagree.

As set forth hereinabove, Shewmaker discloses a method of electrically interconnecting a printed circuit board with a fixed terminal board such that the printed circuit board may be easily removed and replaced with another circuit board. The circuits of the printed circuit board are electrically interconnected with circuits of the fixed terminal board by way of male banana plugs (16). However, Shewmaker fails to teach or suggest all of the limitations of claim 24. More specifically, Shewmaker fails to teach or suggest placing pins *formed of a nonconductive material through the at least two channels and into the at least two holes.*

While the Examiner cites Butler as teaching the use of pins formed of a non-conductive material, there is clearly a lack of motivation to combine the references in the manner proposed

by the Examiner. Shewmaker expressly teaches the use of electrically *conductive* pins as evidenced by the following statements:

> The double-ended male banana plug 16 provides intermediate link in the connecting device and is complementary at one end to female plug 14 in the printed circuit board and at the other end to plug 22 in the terminal board....
>
> It will be apparent that the plugs 16 may be inserted into all or any desired sets of the terminal plugs 14 of the circuit board 13 *to obtain the desired circuit connections*. Thus by using this invention, a single circuit board 13 may be made to serve a plurality of purposes or functions. (Col. 2, lines 31-42; emphasis added).

In other words, Shewmaker teaches away from forming the at least two pins of an electrically non-conductive material. Substitution of pins formed of an electrically non-conductive material for the banana plugs of Shewmaker would render the invention of Shewmaker useless as no electrical interconnections would be effected between the printed circuit board and the fixed terminal board.

Applicants, therefore, submit that claim 24 is allowable over the combination of Shewmaker and Butler and respectfully request reconsideration and allowance thereof. Applicants further submit that claim 30 is allowable as there also is a lack of motivation to form the at least two pins from an anti-static material.

Applicant, therefore, respectfully requests reconsideration and allowance of claim 30.

Obviousness Rejection Based on U.S. Patent No. 2,752,580 to Shewmaker in view of U.S. Patent No. 5,978,229 to Kim

Claims 4, 12, 13, 27, 35 and 36 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Shewmaker (U.S. Patent No. 2,752,580) in view of Kim (U.S. Patent No. 5,978,229). Applicant respectfully traverse this rejection, as hereinafter set forth.

Claims 4 and 13

Each of claims 4 and 13 depend from independent claim 1. Claim 4 introduces the additional subject matter of forming the at least two holes in the carrier substrate includes as blind holes. Claim 13 introduces the additional subject matter of releasing the at least two pins from the head of the pick and place device subsequent placing the at least two pins through the at least two channels and into the at least two holes.

The Examiner cites Shewmaker as disclosing all of the limitations of claim 1 and then cites Kim as teaching the use of a pick and place device. In doing so, the Examiner states: "Please consider the combination of the holder (30) and the semiconductor device package (10) as the head of the pick and place device (see fig. 5)." (Office Action, page 8). The Examiner then states that "it would have been obvious to a person of ordinary skill in the art to include a pick and place device, wherein the head of the pick and place device comprises a holder, and a semiconductor device [has] the at least two pins inserted through the at least two channels." (Office Action, page 8). Applicants respectfully disagree.

As set forth hereinabove, Shewmaker discloses a method of electrically interconnecting a printed circuit board with a fixed terminal board such that the printed circuit board may be easily removed and replaced with another circuit board. The circuits of the printed circuit board are electrically interconnected with circuits of the fixed terminal board by way of male banana plugs (16).

Kim discloses a semiconductor device package having guide pins formed therein, the package being carried by a surface mount technology (SMT) handler (30). However, Kim fails to disclose *engaging at least two channels formed in a semiconductor package with at least two pins carried by a head of pick and place device, and grasping the semiconductor package with the pick and place device.* Nor does Kim ever suggest or intimate that the semiconductor device package (10) should be considered the head of a pick and place device.

Additionally, Applicant finds no suggestion or motivation for using the SMT handler to manipulate the printed circuit boards of Shewmaker. In other words, there is no suggestion or motivation to utilize an SMT handler (which is disclosed by Kim for handling and alignment of

relatively small integrated circuit packages with a circuit board), in order to assist in the interchanging of printed circuit boards as disclosed by Shewmaker.

Applicant, therefore, submits that the combination of Shewmaker and Kim fails to render claim 1 obvious. As such, Applicant submits that claims 4 and 13 are allowable as being dependent from an allowable base claim.

Additionally, with respect to claim 13, even if the Examiner considers the semiconductor package of Kim as the head of a pick and place device (and Applicant maintains to the contrary), Kim fails to teach or suggest releasing the at least two pins from the head of the pick and place device subsequent placing the at least two pins through the at least two channels and into the at least two holes.

Applicant, therefore respectfully requests reconsideration and allowance of claims 4 and 13.

Claims 27, 35 and 36

Each of claims 27, 35 and 36 depend from independent claim 24. The Examiner cites Shewmaker as disclosing all of the limitations of claim 24 and then cites Kim as teaching the subject matter of claims 27, 25 and 36 stating that that "it would have been obvious to a person of ordinary skill in the art to include a pick and place device, wherein the head of the pick and place device comprises a holder, and a semiconductor device [has] the at least two pins inserted through the at least two channels." (Office Action, page 8). Applicants respectfully disagree.

As set forth hereinabove, Shewmaker discloses a method of electrically interconnecting a printed circuit board with a fixed terminal board such that the printed circuit board may be easily removed and replaced with another circuit board. The circuits of the printed circuit board are electrically interconnected with circuits of the fixed terminal board by way of male banana plugs (16). However, Shewmaker fails to teach or suggest all of the limitations of claim 24. More specifically, Shewmaker fails to teach or suggest placing pins *formed of a nonconductive material through the at least two channels and into the at least two holes.*

Moreover, while Kim appears to be silent on forming its guide pins from any particular material, it is noted that Shewmaker teaches away from the use of pins formed of an electrically non-conductive material as evidenced by the following statements:

> The double-ended male banana plug 16 provides intermediate link in the connecting device and is complementary at one end to female plug 14 in the printed circuit board and at the other end to plug 22 in the terminal board....
>
> It will be apparent that the plugs 16 may be inserted into all or any desired sets of the terminal plugs 14 of the circuit board 13 *to obtain the desired circuit connections.* Thus by using this invention, a single circuit board 13 may be made to serve a plurality of purposes or functions. (Col. 2, lines 31-42; emphasis added).

In other words, substitution of pins formed of an electrically non-conductive material for the banana plugs of Shewmaker would render the invention of Shewmaker useless as no electrical interconnections would be effected between the printed circuit board and the fixed terminal board.

As such, Applicants submit that claim 24 is clearly allowable over the combination of Shewmaker and Kim. Applicants further submit that claim 27, 35 and 36 are allowable as being dependent from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to claim 36, Applicant submits that, contrary to the Examiner's assertion, Kim fails to teach using a pick and place device to align the semiconductor device package with the carrier substrate by carrying the pins with the head of the pick and place device and *placing the pins through the at least two channels and the at least two holes.*

Applicant, therefore, respectfully requests reconsideration and allowance of claims 27, 35 and 36.

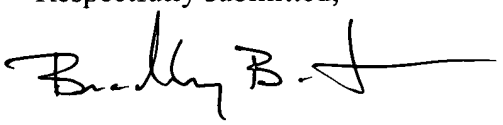
ENTRY OF AMENDMENTS

The amendments to claims 1, 10, 13 and 24 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. Further, the amendments do not raise new issues or require a further search.

CONCLUSION

Claims 1, 4, 6 through 8, 10, 11, 13, 24, 27, 30, 31, 33, 35 and 36 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicant's undersigned attorney.

Respectfully submitted,



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